Simulation-Based Lunar Telerobotics Design, Acquisition and Training Platform for Virtual Exploration, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

Meeting the objectives of returning to the moon by 2020 will require NASA to fly a series of telerobotic lunar orbital and surface vehicles to prove the viability of In Situ Resource Utilization (ISRU) and assist in precursor human base preparation. A real-time 3D tool that creates plausible simulations of space environments and vehicles can bring an urgently needed rapid prototyping capability to this large vehicle & mission design task. Digital Spaces Prototyper (DSS-Prototyper) will allow teams to rapidly prototype vehicle and mission designs week-to-week and tie real-time 3D simulations to teams meetings, teleconferences, web documents, CAD databases and other decision support tools. In Phase I, DigitalSpace modeled Colorado School of Mines' prototype lunar bucket wheel excavator (BWE) to create a plausible design simulation of a lunar surface vehicle. The BWE was chosen as it is one of the only lunar ISRU-oriented prototypes in the world. Phase I features implemented in DSS-Prototyper include: - Dynamics of a rover operating within a hypothetical lunar base. - Force feedback joystick interface creating fine operator controls. - Integrated physics engine creating vehicle/terrain contact models and an approximation of regolith properties. - Auto-stereo display supporting 3D immersion. Phase II features: - Fully synchronized multi-use interface supporting team simulation viewing, recording and playback of simulation sequences. - A component wrapper and open framework to connect with Windchill, ICE, Nexiom, NASA and contractor design tools. - Annotation features associating CAD and simulation to text, documents and an asynchronous web site blog for team commentary. - A half dozen lunar vehicle and mission scenario designs for sharing and iteration by a team of world-class advisors and evaluators. - Delivery of DSS-Prototyper to NASA in an open source package for use by any team implementing new exploration vision.

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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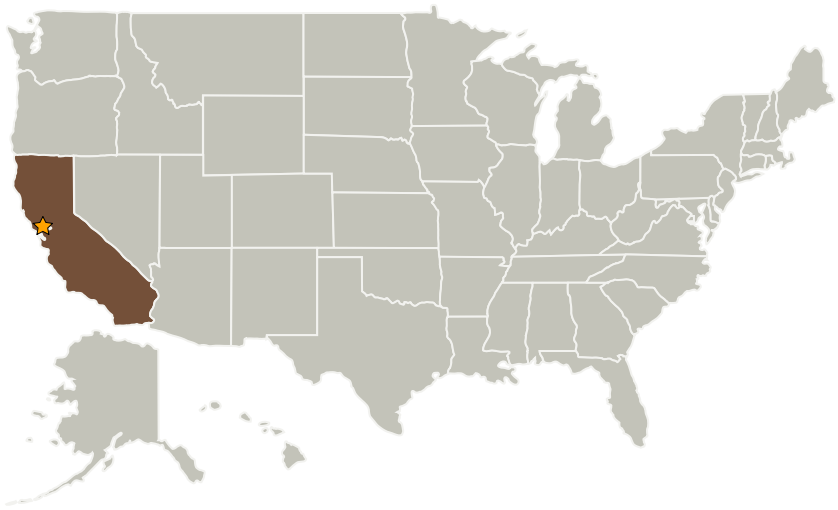
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
DigitalSpace Corporation	Supporting Organization	Industry	Santa Cruz, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL